

BOT0097– November 2015

**FACULTY OF SCIENCE****DEPARTMENT OF BOTANY and PLANT BIOTECHNOLOGY**

MODULE	ADVANCED PLANT TAXONOMY AND ECONOMIC BOTANY BOT0097
CAMPUS	APK
EXAMINATION	NOVEMBER 2015

DATE
09/November/2015**SESSION**
08:30 – 11:30**EXAMINER:****PROF A. MOTEETEE****INTERNAL MODERATOR:****PROF M. VAN DER BANK****EXTERNAL EXAMINER:****DR. J.S. BOATWRIGHT****DURATION: 3 HOURS****MARKS: 150**

NUMBER OF PAGES: 6 PAGES**INSTRUCTIONS: ANSWER ALL THE QUESTIONS**

QUESTION 1**[23]**

1.1 Draw diagrams to distinguish between the following shapes:

(6)

- a) Hastate and sagittate
- b) Cordate and reniform
- c) Elliptic and oblong

- 1.2 Discuss the different leaf anatomy characters that can provide taxonomic evidence. (5)
- 1.3 Giving examples, discuss how the following reproductive characters can be used to distinguish plant families: (12)
- a) Inflorescence type
 - b) Floral symmetry
 - c) Fruit type

QUESTION 2 [20]

- 2.1 What is the difference between: (4)
- a) Axile and parietal placentation
 - b) Basal and apical placentation
- 2.2 Explain formation of the anther wall between the endothecium and tapetum. (5)
- 2.3 Discuss how chromosome numbers can be used for taxonomic purposes. (5)
- 2.4 Describe endosperm development in flowering plants. (6)

QUESTION 3 [10]

- 3.1 Define the following terms: (5)
- a) Polygadioecious
 - b) Protandry
 - c) Enantiostryly
 - d) Andromonoecious
 - e) Endogamy
- 3.2 List ten (10) factors that prevent interbreeding in nature. (10 x ½ = 5)

QUESTION 4 [9]

Discuss various classes of flavonoids as well as their chemical structures.

QUESTION 5 [8]

Outline the following techniques and how they can be used for taxonomic purposes:

- 5.1 Electrophoresis
- 5.2 Serology

QUESTION 6

[30]

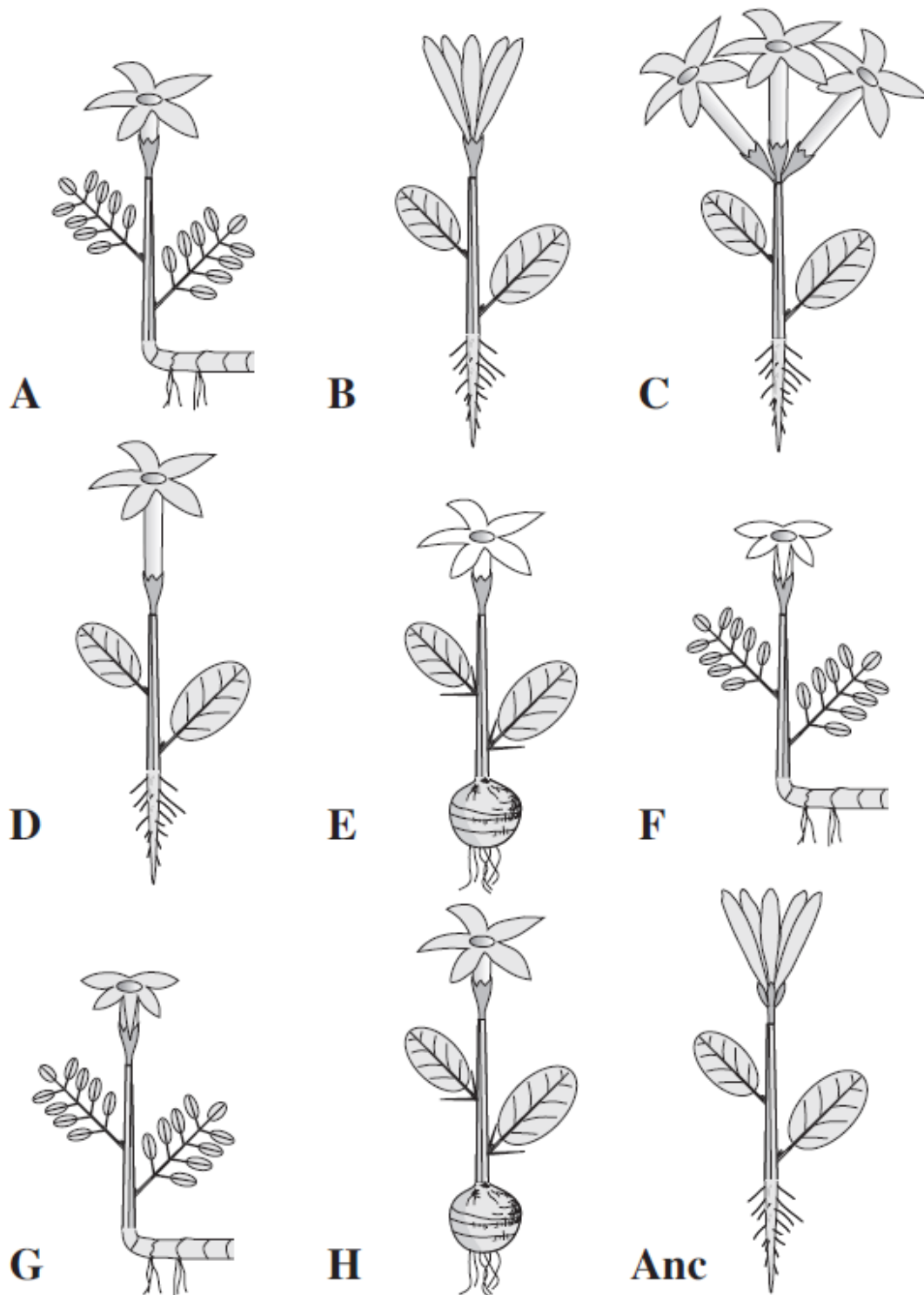
- 6.1 What is the name of the work that provides the rules and recommendations for plant nomenclature? (1)
- 6.2 What is the additional, validly published name for the following plant families? (5)
- a) Apiaceae
 - b) Arecaceae
 - c) Asteraceae
 - d) Brassicaceae
 - e) Poaceae
- 6.3 What is the rank of the following? (5)
- a) Conostylidoideae
 - b) Flacourtiaceae
 - c) Haemodoreae
 - d) *Linnaea borealis*
 - e) Rosales
- 6.4 Describe the following categories of nomenclatural types: (4)
- a) Holotype
 - b) Isotype
 - c) Lectotype
 - d) Neotype
- 6.5 When and with what publication does priority of publication officially begin? (2)
- 6.6 What criteria must a scientific name meet in order for it to be validly published? (4)
- 6.7 Changes in the circumscription of a taxon do not normally justify a name change, except under which circumstances? Give examples. (6)
- 6.8 Name three Latin genders and give their standardised endings. (3)

QUESTION 7

[40]

- 7.1 In which plant genera are the following early herbalists commemorated: (3)
- a) Otto Brunfels

- b) Leonhart Fuchs
 - c) Mathias de L'Obel
- 7.2 Who is an Italian often regarded as the first true taxonomist and why? Which genus name commemorates this botanist? (3)
- 7.3 In which publication does Linnaeus' sexual system appear? Discuss this system. (5)
- 7.4 Name three organisms, with names that commemorate Carl Linnaeus. (3)
- 7.5 Discuss classification systems of (a) Michel Adanson and (b) Antoine Laurent de Jussieu and comment on how their systems differ from that of Linnaeus. (8)
- 7.6 According to Bessey, which of the following characters should be regarded as primitive and which ones should be regarded as advanced? (10 x ½ = 5)
- a) Plants woody
 - b) Floral parts cyclic
 - c) Ovary inferior
 - d) Flower parts spirally arranged
 - e) Flowers unisexual
 - f) Floral axis long
 - g) Floral parts many
 - h) Petals fused
 - i) Flowers zygomorphic
 - j) Flowers inferior
- 7.8 Carefully study the figure below showing eight species (A-H) of a hypothetical group of plants, as well as an extinct ancestor ("Anc"), which contains all ancestral characteristics. (13)
- a) Choose a maximum of five characters and polarise the associated character states.
 - b) Construct a "Character x Taxon" data matrix.
 - c) Draw the cladogram for the hypothetical organisms
 - d) Indicate the following as applicable: monophyletic groups, sister taxa, synapomorphies, apomorphies, and plesiomorphies



QUESTION 8

[10]

- 8.1 Describe the botanical exploration of Carl Pehr Thunberg to southern Africa and his contribution to the southern Africa taxonomy. (5)
- 8.2 Which steps must be followed when preparing plant specimens for deposition in a herbarium? (5)